

Capasso 65-104-1-19-28-7-34-13

IN THE CLAIMS:1. - 7. *cancelled*

8. (*currently amended*) A unipolar quantum cascade (QC) laser device particularly configured to provide a measurement of intersubband electroluminescence (ISB-EL), said QC laser device comprising the following layers and regions formed on a semiconductor substrate:

a core region including a QC active region which comprises a multiplicity of unipolar radiative transition regions interleaved with a multiplicity of unipolar injection/relaxation regions,

upper and lower cladding regions bounding said core region, at least said upper cladding region and said core region having the shape of a longitudinal stripe having sidewalls and a top surface, said lower cladding region disposed to cover a top major surface of said semiconductor substrate

an active region formed as a ridge-waveguide structure on a top major surface of a semiconductor substrate;

an insulating layer disposed to cover the extent of said active region;

a top metal contact layer disposed over the stripe-shaped upper cladding region

a bottom metal contact layer disposed to overlay a bottom major surface of said semiconductor substrate; and

a pair of laser facets formed as the terminations of said stripe-shaped core region ridge-waveguide structure, said facets formed to be orthogonal to the extent of said ridge-waveguide structure said longitudinal stripe-shaped core region such that upon the application of a bias current between said top and bottom metal contact layers, laser emission will be created in a longitudinal direction along said ridge-waveguide structure QC active region and exit at said pair of laser facets (*only if not coated*)

CHARACTERIZED IN THAT

the unipolar quantum cascade laser structure is formed to include a longitudinal cleave through the ridge-waveguide structure stripe-shaped upper cladding and core regions so as to expose the QC active region and a longitudinal facet of said semiconductor substrate and waveguide, and the laser facets are formed to include a

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highly reflective surface coating, such that intersubband electroluminescence (ISB-EL) will exit from the exposed QC active and region.

9. *(currently amended)* The device of claim 8 wherein the ~~insulator layer~~ upper and lower cladding regions each comprises a layer of SiN.

10. *(original)* The device of claim 8 wherein the top and bottom metal contact layers comprise Ti/Pt/Au.

11. *(currently amended)* The device of claim 8 wherein the pair of laser facets comprise coatings ~~include~~ including an inner layer of SiO₂ and an outer layer of Ti/Au and Ge/Au/Ag/Au, respectively.